AN ANALYSIS OF SOME OF THE FACTORS AFFECTING THE CLOSING OF ONE-ROOM RURAL SCHOOLS IN IOWA

by

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Signatures have been redacted for privacy

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INTRODUCTION

Problem

In reviewing the rural school situation in Iowa over a period of years it has been noted that there has been no great variation from year to year in the number of rural schools in operation. However, since 1935 there has been a steady decrease.

At the present time the problem of reorganizing schools is a vital one for Iowa educators and lay people. Much time and attention have been given to the gathering of information which will enable the County Boards of Education to make wise decisions in regard to the problems of reorganization within their counties.

Method of Procedure

The many factors which influence the closing of the one-room schools can be classified into two groups. The one group consists of the subjective factors or those which are difficult to measure or evaluate. In this group would be such factors as: amount of local interest, attitude of school officials, and desire of parents for a better education for their children. The

second group consists of the objective factors or those which can easily be evaluated or measured, and can be assigned definite values. It is with some of the second group of factors that this analysis will deal.

The factors chosen for this study are:

1. The percentage of the total number of miles of all rural roads that are surfaced.
2. The taxable property per farm child, ages 5-20 inclusive.
3. Percentage of consolidation among districts maintaining high schools.
4. The change in rural farm population, ages 5-19 inclusive, per square mile of farm land between 1930 and 1940.
5. The density of rural farm population, ages 5-19 inclusive, per square mile of farm land for 1940.

The degree of relationship between these factors and the percentage of closed one-room schools will be determined by statistical methods.

In gathering the data for this analysis it was possible to obtain all the necessary information from official reports with the exception of the percentage of closed schools during the 1946-47 school year. It was necessary to secure these data from the Department of Public Instruction because the biennial report which would include the school year 1946-47 was not yet available.

Purpose

The purpose of this study was to determine the relationship between the percentage of closed one-room rural schools and the following factors:

1. The percentage of the total number of miles of all rural roads that are surfaced.
2. The taxable property per farm child, ages 5-20 inclusive.
3. Percentage of consolidation among districts maintaining high schools.
4. The change in rural farm population, ages 5-19 inclusive, per square mile of farm land between 1930 and 1940.
5. The density of rural farm population, ages 5-19 inclusive, per square mile of farm land for 1940.

The determination of these relationships may assist the County Boards of Education in planning for reorganization of school districts within their respective counties.

REVIEW OF LITERATURE

Early History

Related literature concerning the closed one-room schools in Iowa involves a great deal of early history. In order better to understand the importance of the problem and the complicated issues involved in the solution of it some of the historical background of the one-room schools may be of value. Iowa's school systems lack uniformity in organization. Although, generally grouped under two heads, school township and independent districts, the independent districts are of several types distinguished by the nature of their territory.

Samuelson and Williams[1] list the characteristic differences in these districts as follows:

1. School Township--usually in the open country, providing two or more one-teacher elementary schools; embraces the territory of a civil township or less; managed by a board of directors, one from each sub-district and one at large if the number of sub-districts is even (three if not divided into sub-districts), who are elected for one year.

2. Rural Independent--usually in the open country, providing a one-teacher elementary school; generally with

[1]Samuelson, Agnes and Williams, R. C. Public School Finance in Iowa. Research Bulletin No. 6. State of Iowa. 1930. pp. 16-17.

four square miles of territory; managed by a board of three directors (five if the population of the district is over 500), elected by the voters of a district for a term of three years.

3. Town or Village (Not Consolidated)--territory including a town or village providing elementary or both elementary and secondary schools; managed by a board of five directors (three if the population of the district is 500 or less), elected for three-year terms.

4. Consolidated--not less than 16 government sections of contiguous territory; transports children living outside an incorporated town, or who live more than one mile from the school, at public expense; generally includes both elementary and secondary grades; formed by the union of several one-teacher rural schools and may or may not include an incorporated town; voters of the district elect a board of five directors at large for three-year terms.

5. Second class cities--including a city with a population of from 2,000 to 15,000; has a board of five directors elected for three-year terms.

6. First class cities--including a city of over 15,000 population; has a board of seven directors who hold office for three years (six years in cities of 125,000 or more population).

Aurner[1], working with the State Historical Society, prepared a history of education in Iowa. The following is an account of some of the early history as it was reported by him.

The first school in Iowa was located within the present boundaries of Lee county and was conducted as a private venture. The first permanent settlement at

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[1]Aurner, Clarence Ray. History of Education in Iowa. The State Historical Society of Iowa. Iowa City. 1914.

Dubuque was early in 1833 and during the fall of the same year a school was built there. Before Iowa was organized as a territory, schools were reported in Jackson, Louisa, Muscatine and Van Buren counties. It is estimated that about 40 or 50 schools were in existence at the time Iowa was organized as a territory. At that time the only legislation applicable to the schools was found in the laws of Michigan. Governor Lucas in his first meeting with the territorial legislature at Burlington urged that provision be made to organize the state into townships. He felt that without township organization it would be difficult to establish any real school system.

In January of 1839 the territorial legislature passed an act providing for the establishment of public schools open to every class of white citizen between the ages of 4 and 21. The county boards, which consisted of three trustees, were authorized to form districts in their respective counties whenever a petition was presented to them for that purpose. This act indicated that the school districts were not to be less than a township in area. Each school was to be governed by a board of three trustees, who were to employ teachers, supervise the schools and to collect and disburse the taxes voted by the electors for school purposes.

Near the close of the territorial period the rate bill was adopted as an additional means of financing education. The teachers wages were to be paid by a tax levy, but any additional funds required to maintain a school were to be assessed against the parents in proportion to the number of pupils sent. This bill was in effect until 1858.

The assembly of 1839-1840 adopted the school laws of Michigan. By this act the establishment of districts and all school organization became a township function. When Iowa became a state in 1846 it had a reported school population of about 20,000 and about 400 districts had been formed. These numbers increased rapidly with each successive year.

In 1849 all legislation for the establishment of schools was repealed. The new statutes added some new features and retained some of the old. The electors were given the authority to establish higher grade levels, determine the course of instruction, determine the number of instructors to be employed and to cause the school boards to make classification of pupils as they thought necessary. For this purpose they were granted the privilege of erecting one or more school houses. This was the first legal provision for higher grade levels, courses of study and classification of pupils.

Although the legislative provisions at this time were of great help to the schools, more were needed as was shown by Governor Ansel Briggs'[1] last message to the legislature in which he stated, "It is hoped that a very considerable portion of your time and attention be expended in efforts to perfect our system of common school education."

In 1856 the Superintendent of Public Instruction, Hon. M. L. Fisher[2] recommended that the township organization plan be adopted. This plan had also been recommended by Horace Mann and other leading educators of the day. It had been adopted by Massachusetts and Pennsylvania and was considered very successful. The following are some of the advantages which Fisher pointed out:

1. It would provide as many schools as necessary, each a part of the central organization.
2. It would reduce the number of school officers, and thus allow school directors a compensation for services rendered.
3. It would establish a uniform tax rate.
4. It would provide more uniform advantages.
5. It would simplify the school laws.
6. It would permit the pupils to attend where their interests were best served.

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[1]Iowa Department of Public Instruction. Biennial Report. State of Iowa. 1873-75. p. 29.

[2]Ibid. pp. 16-17.

7. It would prevent strife about district lines.

8. It would reduce school costs.

9. It would provide for a more efficient system of school inspection and supervision.

10. It would provide more competent teachers.

11. It would provide more compensation and more permanence for teachers.

12. It would provide better buildings, equipment and repairs.

13. It would provide uniform textbooks.

14. It would result in more uniform teaching methods.

15. It would provide more uniform reports and more reliable statistics.

In 1858 an act was passed which provided that each township be declared a school district, and each district already organized was to become a sub-district. It further provided that each incorporated town with a population of 1,000 or more be a separate school district. This law reduced the number of school districts from 3,500 to 900. It also reduced the compensation paid to district secretaries and treasurers by nearly $31,000, or more than the total amount that was at that time being paid to all the county superintendents.[1]

In December of 1858 a law was enacted which provided

[1]Iowa Department of Public Instruction. Biennial Report. State of Iowa. 1873-75. pp. 17-18.

that any incorporated town with a population of 300 or more could constitute a school district by a majority vote of the electors. In 1866 this privilege was extended to all incorporated towns or sub-districts containing not less than 200 inhabitants.[1] It soon became apparent that this act would lead to the formation of districts in the more thickly settled and wealthier portion of the township and the act was repealed early in the next session of the general assembly.

In 1872 the general assembly enacted a law which provided for the formation of independent districts from sub-districts of a township district. By 1875 the number of independent districts had increased by more than 1,000.[2]

Dissatisfaction on the part of the parents living in the rural school districts led to the consolidated school movement. This movement was an attempt to put a four-year high school within the reach of every boy and girl in the state of Iowa.[3]

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[1]Iowa Department of Public Instruction. Biennial Report. State of Iowa. 1873-75. pp. 18-19.

[2]Ibid. p. 20.

[3]Brown, George A. Iowa's Consolidated Schools. Department of Public Instruction. State of Iowa. 1922. p. 3.

The changes in the total number of school corporations at the end of each five-year period from 1860 to 1945 are shown in Figure 1. It will be noted that the high point in the number of school corporations was reached in 1910. For the next twelve years quite a number of consolidated districts were formed, which for a while seemed to be the solution to Iowa's rural educational problem. However, this plan has met with some dissatisfaction and during the period between 1930 and 1945 the number of corporations remained almost unchanged.

Consolidated School Movement

Lancelot & Morgan[1] made a study of Iowa's farm youth which reveals some interesting facts regarding the declining number of young people living on farms during the period between 1930 and 1940. In this study they found that there had been a loss of 6.1 percent of young people from the consolidated and town independent districts, compared with 19.5 percent from the districts having only rural elementary schools. Other than the differences in educational advantages no reason

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[1]Lancelot, W. H. & Morgan, Barton. Iowa's Vanishing Farm Youth and Their Schools. Ames, Iowa Agricultural Experiment Station Bulletin P81. September, 1946. p. 678.

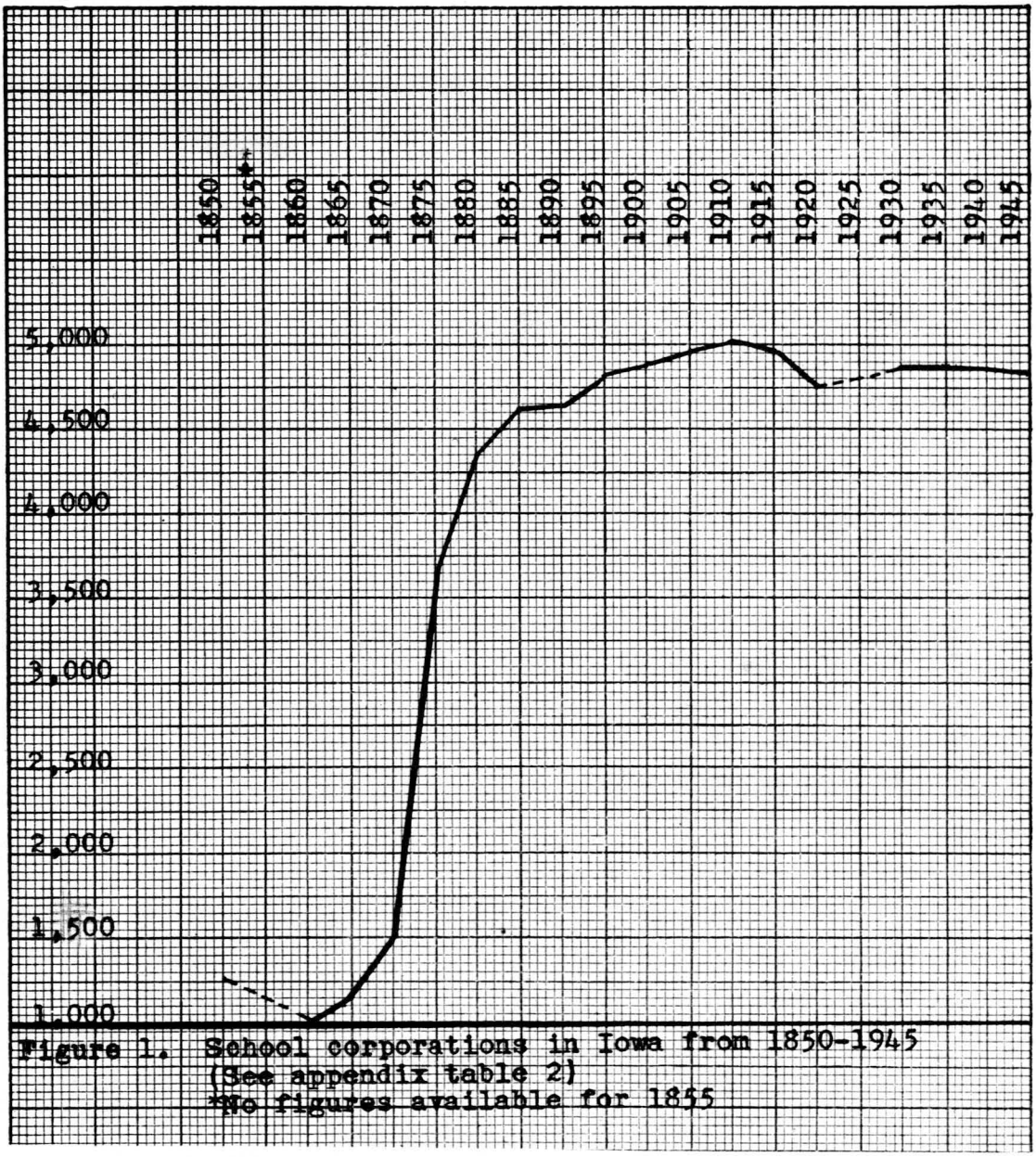

Figure 1. School corporations in Iowa from 1850-1945
(See appendix table 2)
*No figures available for 1855

is apparent why the migration from the rural elementary districts should be more than three times greater than from the districts with high schools. Therefore they have concluded that migration from Iowa's farms is largely caused by the limited educational opportunities provided in districts with one-room schools.

The consolidated school movement has been an attempt to put a four-year high school within the reach of every boy and girl in the State of Iowa. For the first fifteen years the movement spread slowly.

In 1896 the first consolidated school was formed at Buffalo Center. It consisted of an entire township unit made up of nine sub-districts. In 1901 the second consolidated district was formed at Terril in Dickinson county where nine sub-districts in Lloyd township formed the district. The third consolidated district was formed at Marathon in Buena Vista county in 1902 and the fourth one at Lake township in Clay county in 1903.[1]

In 1913 the general assembly provided for state aid to consolidated schools which awakened new interest and

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[1]Iowa State College Staff. A Century of Farming in Iowa. Ames: Iowa State College Press. 1946. p. 311.

did a great deal towards establishing and maintaining high schools.[1]

The first laws regarding consolidation provided that no districts be formed with less than sixteen government sections of land. Even in 1922 this was not sufficient to accomplish the purpose originally intended. Twenty-four sections were then considered about the least area that could give a valuation sufficient to keep taxes from becoming burdensome if a four-year high school was to be maintained.[2]

With the improved highways and modern transportation facilities, it is possible to have much larger units today than it was during the early periods of consolidation.

Iowa's largest school district was formed at Vinton on October 2, 1946. It is made up of the Vinton Independent district and twenty-nine surrounding rural school districts. It embraces 120 sections of land and has a taxable valuation of $6,500,000. Earl Cope, superintendent of the Vinton schools at the time the district

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[1]Aurner, Clarence R. History of Education in Iowa. Iowa City: State Historical Society of Iowa. 1914. p. 231.

[2]Brown, George A. Iowa's Consolidated Schools. Des Moines: Department of Public Instruction. 1922. p. 3.

was formed said, "With a district of this size there is a large enough tax basis to make for an economically administered school. Consequently, the town and rural pupils both benefit from having enough money available and a large enough enrollment to provide a program which will best serve their needs and abilities."[1]

Frost[2] in reporting on the size of schools said, "Unless local schools are organized to include more school children, it may be expected that effective control will pass from local hands to regional, state or national authority in the future."

In a similar vein Sanderson[3] said, "In general, the small rural community with a village of less than 500 or 600 inhabitants will not be able to support a high school. The large rural communities with a village of 1200 or more inhabitants is the best place for a senior high school, which will be the central institution for integrating the large rural community."

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[1]Cope, Earl. "Story of the Formation of Iowa's Largest School District." Midland Schools. 61:110. December, 1946.

[2]Frost, Norman. "What Size School System?" The Nation's Schools. 23:57-58. February, 1939.

[3]Sanderson, Dwight. Rural Sociology and Rural Social Organization. New York: John Wiley & Sons, Inc. 1942. pp. 388-389.

A study made by the Iowa Farm Bureau Federation[1] gives an account of what has been done in some of the other states. Washington has reduced the number of districts by 60 percent since the passage of the School Reorganization Law in 1941. Its people are looking forward to a state system of approximately 320 districts. New York has organized the original 4,480 districts into 311 central rural school districts between 1925 and 1945. Illinois and Kansas both have new reorganization laws. In Iowa, however, a serious obstacle has been encountered.

Lancelot and Morgan[2] found that the value of farm property per farm child in Iowa is, on the average, about three times as great as the amount of nonfarm property per nonfarm child. This study indicates that some plan to equalize the costs of education for farm and nonfarm people may be necessary in order to bring about further reorganization. This failure to reorganize has been accompanied by the growth of the closed school movement.

The number of consolidated schools for each

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[1]Iowa Farm Bureau Federation. Next Steps in Rural Education. Des Moines: The Iowa Farm Bureau Federation. 1946. p. 7.

[2]Lancelot, W. H. & Morgan, Barton. Iowa's Vanishing Farm Youth and Their Schools. Bulletin P81. Ames: Iowa Agricultural Experiment Station. 1946. p. 688.

five-year period beginning with 1900 is shown in Figure 2. The largest number of consolidated districts was in 1930. Since that time the number has decreased slightly, which would indicate that some of the consolidated districts have been dissolved. It is clear that very little consolidation has taken place since 1930.

The rural enrollment for each two-year period beginning with 1916 is shown in Figure 3. Over this thirty-year period the rural enrollment has declined by more than 50 percent.

Recent School Trends

Reports from the Department of Public Instruction show that although there has been little change in the number of consolidated districts during the past fifteen years there were nearly 2,000 fewer rural schools in operation in 1945 than there were in 1930. There are undoubtedly many factors which are influencing the closing of one-room rural schools.

Gaar[1] in her study of the qualifications of Iowa's rural teachers has found that the poorest trained, and

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[1]Gaar, Johnnie B. Educational Qualifications of Teachers in One-Room Schools in Iowa. Master's Thesis. Ames: Iowa State College. 1942. p. 29.

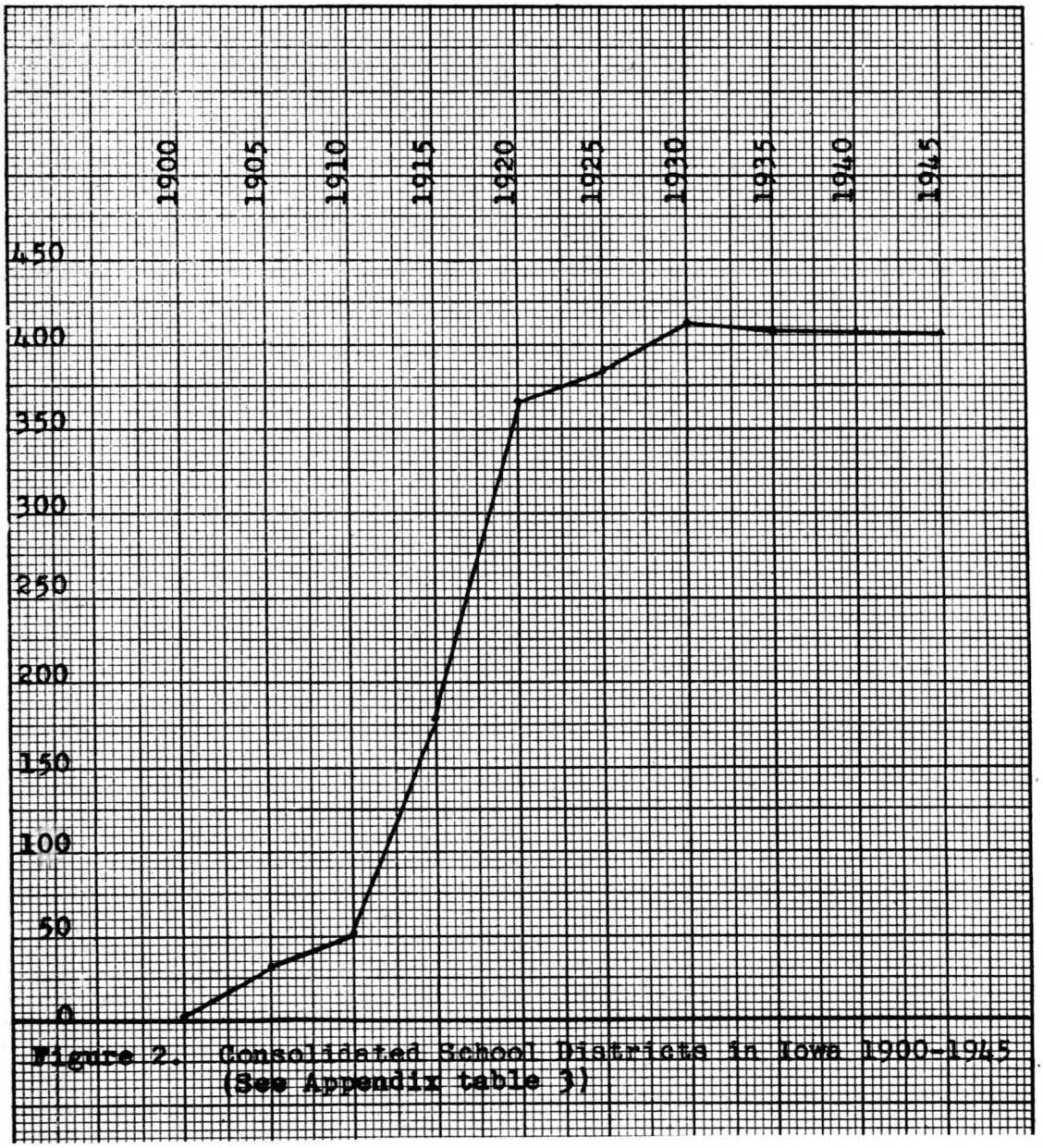

Figure 2. Consolidated School Districts in Iowa 1900-1945
(See Appendix table 3)

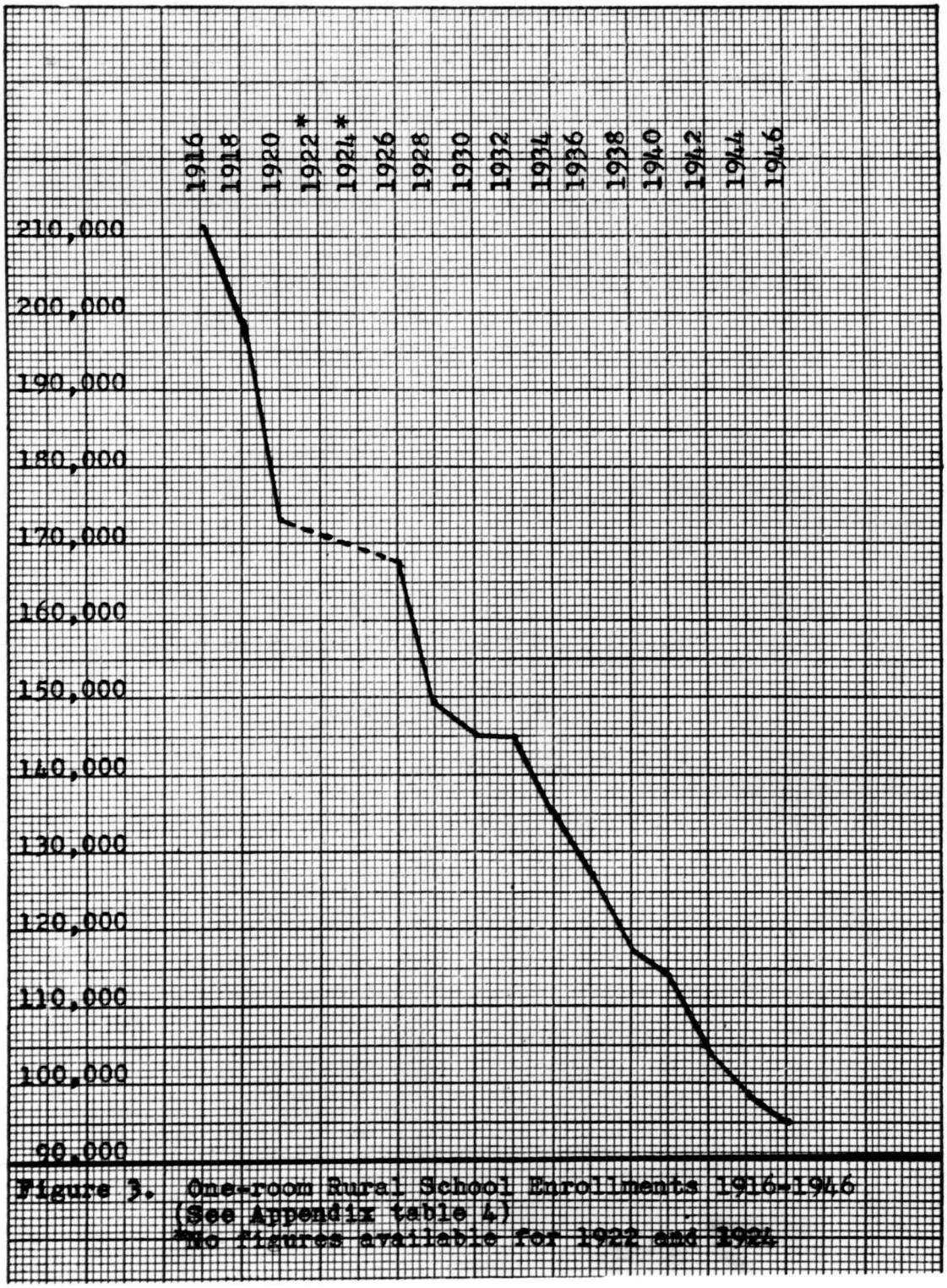

Figure 3. One-room Rural School Enrollments 1916-1946
(See Appendix table 4)
*No figures available for 1922 and 1924

poorest paid teachers are found in the rural schools.

Beal[1] in her study compared the personal adjustment of rural and urban 9th grade children and has found that there is a tendency for children attending one-room rural schools, especially girls, to be less well adjusted at the 9th grade level than children attending graded schools.

Moore[2] studied the entire high school enrollment of the State Center Consolidated school district for the year 1947-48. He classified the students as farm and nonfarm, and compared the achievement of the two groups on a battery of tests given by the Iowa State College Testing Bureau. He found no significant difference between farm and nonfarm pupils on any of the tests with the exception of some of the phases of the California Test of Personality. The farm students were significantly better adjusted socially, their self-adjustment significantly better and their family relationships more satisfactory.

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[1]Beal, Anne Elizabeth. Comparison of Rural and Urban Ninth Grade Children in Personal Adjustment. Master's Thesis. Ames: Iowa State College. 1940. pp. 137-38.

[2]Moore, Glenn. Aptitudes, Interests, and Personality Characteristics of Farm and Non-Farm Pupils of the State Center High School. Master's Thesis. Ames: Iowa State College. 1948.

Molesberry[1] in her study of the knowledge of social standards of children attending rural schools and those attending town and consolidated schools found the children attending town and consolidated schools better fitted socially upon graduating from eighth grade than children attending rural schools.

Farm leaders and educators have made recommendations concerning an improved educational program.[2] One-room schools were declared unable to develop the kind, quality and amount of education which the farm leaders recommended.

In a survey made by Thaden and Elliott[3] of the closed schools in Michigan, they found that there is a tendency to close schools in areas where the population is sparse, land poor, and the income and land values low. However, many schools are also being closed in counties that present a fairly satisfactory picture

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[1]Molesberry, Hazel. Sociability and Knowledge of Social Standards of Eighth Grade Pupils in Adair County. Master's Thesis. Ames: Iowa State College. 1936.

[2]American Institute of Cooperation. Farm Leaders and Teachers Plan Together. Washington: National Education Association. 1947. pp. 19-21.

[3]Thaden, J. F. and Elliott, Eugene B. "Closed Michigan Rural Schools." East Lansing: Michigan Agricultural Experiment Station Quarterly Bulletin. Vol. 29, No. 2. November, 1946. pp. 147-64.

in these respects. Thaden and Elliott attributed this to the strong desires of the well informed leaders who are desirous of making educational advantages available to rural boys and girls. They found that a school once closed seldom reopens, but eventually unites with another district. It is with this transition period, during which time the closed school district is not carrying its fair share of the cost of education, that they are concerned. They feel it is the duty of lay leaders and educators to complete the transition from the closed school in a gradual, healthy and wholesome manner.

In many counties the recent trend seems to be to close the one-room rural school and to transport the pupils to other districts where they attend as tuition-paying pupils. In other counties the one-room rural school has continued to operate despite low enrollments, inadequate supply of teachers, and excessively high operating costs. Why the schools in some counties are closing and continuing to operate in other counties becomes a question of vital importance.

The 1946[1] legislature provided that the county

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[1] Iowa, Code of Iowa. Vol. 1, State of Iowa. 1946. Ch. 275.

boards of education be given authority to initiate detailed studies and surveys for the purpose of reorganizing school districts. The 1947[1] legislature appropriated $49,000 from the general fund to be allocated to the counties for making the surveys, but the amount is not to exceed $500 per county.

The bulletin prepared by the Iowa Farm Bureau Federation[2] suggested that the following desirable features be included in further reorganization legislation:

1. Provide for a county survey committee or board of education with fiscal independence and power to act.
2. Provide for state aid to be paid only under certain conditions.
3. Provide for a state committee to be appointed by the state superintendent.
4. Abandon the requirement of a 60 percent majority vote in each affected district.
5. Equalize the distribution of the cost between the rural and urban taxpayers.

Figure 4 graph shows the number of rural one-room schools in operation at the end of each five-year period

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[1]State of Iowa. Acts and Joint Resolutions Passed at the Regular Session of the Fifty-Second General Assembly. State of Iowa. 1947. p. 179.

[2]Iowa Farm Bureau Federation. Next Steps in Rural Education. Des Moines: The Iowa Farm Bureau Federation. 1946. p. 10.

beginning with 1850. The peak was reached in 1900 at the time of the beginning of the consolidated school movement. Although the number of consolidated districts has decreased since 1930 the number of rural one-room schools have also decreased by 2,000.

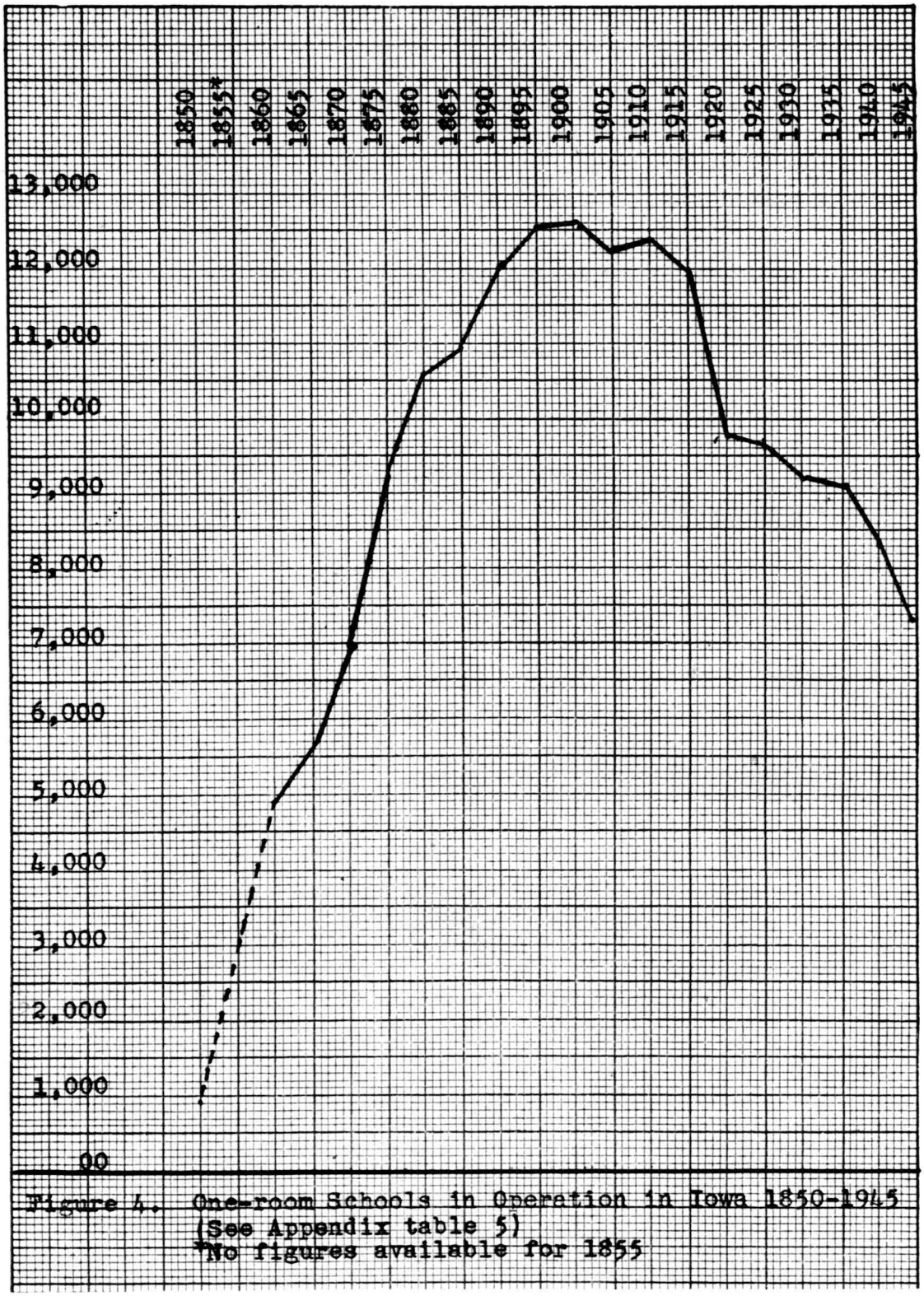

Figure 4. One-room Schools in Operation in Iowa 1850-1945
(See Appendix table 5)
*No figures available for 1855

FACTORS INFLUENCING THE CLOSING OF ONE-ROOM SCHOOLS

As indicated earlier this study does not attempt to determine the influence of all possible factors upon the closing of one-room schools in Iowa. Indeed, only five of the objective factors have been studied.

The following information was computed for each county.

1. Percentage of closed schools in 1946.
2. Percentage of total miles of rural roads surfaced.
3. Taxable farm property per farm child (in hundreds).
4. Percentage of consolidation among districts maintaining high schools.
5. Loss of farm population, ages 5-19 inclusive, between 1930 and 1940.
6. Density of farm population, ages 5-19 inclusive, for 1940.

Treatment of Data

The coefficients of correlation between the percentage of closed schools and each of the five factors were calculated.

The coefficients of correlation between the percentage of closed schools and the percentage of total miles of rural roads surfaced was found to be .4712.

When this coefficient of correlation was tested for significance it was found to be significantly different from zero at the one percent level of confidence.

The coefficient of correlation between the percentage of closed schools and the taxable property per farm child was found to be .3977. When this coefficient of correlation was tested for significance it was found to be significantly different from zero at the one percent level of confidence.

The coefficient of correlation between the percentage of closed schools and the percentage of consolidation among districts maintaining high schools was .5900. When this coefficient of correlation was tested for significance it was found to be significantly different from zero at the one percent level of confidence.

The coefficient of correlation between the percentage of closed schools and loss in farm population was found to be .0088. When this coefficient of correlation was tested for significance it was found to be not significantly different from zero.

The coefficient of correlation between the percentage of closed schools and the density of farm population was found to be .0434. When this coefficient of correlation was tested for significance it was found to be not significantly different from zero.

Of the five factors studied, it is clear that the percentage of high schools consolidated in each county bears the highest relationship to the closing of the one-room schools. Possible explanation of this high relationship may be the examples of the consolidated schools as offering superior programs of education, the presence of established bus routes easily available to children in the one-room schools or other factors likewise not measured.

The percentage of roads surfaced shows the next highest relationship to the closing of the one-room schools. In counties where roads make transportation easily available, the one-room schools are closing in greater numbers.

The total valuation of farm land per child shows the next highest relationship to the closing of the one-room schools. This may indicate that people on the better farm land have a desire for a better education for their children than the one-room schools can provide, or it might be explained by the relatively larger number of consolidated schools in areas of better farm land. In all events, people on poorer farm lands seem less likely to close their one-room schools.

It is rather clear that these three factors are much more significant in explaining the closed school

movement in Iowa than are the two population factors. Low densities of child population on the farms and the loss in farm child population in recent years were not factors accounting for the closing of one-room schools.

Prediction of Percentage of Schools Closed in 1946-47

Since the relationship between the percentage of rural schools closed and the two population factors tested were not significantly different from zero, they were not considered in the regression.

In order to predict the percentage of closed schools in each county from the remaining factors a regression equation was needed of the form:

$$Y = aX_1 + bX_2 + cX_3 + k$$

where

Y = percent of closed schools in 1946-47

X_1 = percent of total rural roads surfaced

X_2 = taxable farm property per child (in hundreds)

X_3 = percent of consolidation among districts maintaining high school

a, b, c and k are appropriate constants.

The method of least squares was used, and the

normal equations were found of the form:

$$\Sigma YX_1 = a\Sigma X_1^2 + b\Sigma X_1X_2 + c\Sigma X_1X_3 + k\Sigma X_1$$

$$\Sigma YX_2 = a\Sigma X_1X_2 + b\Sigma X_2^2 + c\Sigma X_2X_3 + k\Sigma X_2$$

$$\Sigma YX_3 = a\Sigma X_1X_3 + b\Sigma X_2X_3 + c\Sigma X_3^2 + k\Sigma X_3$$

$$\Sigma Y = a\Sigma X_1 + b\Sigma X_2 + c\Sigma X_3 + Nk$$

Substituting the appropriate values the normal equation becomes:

$$230419.51 = 406290.43a + 419068.0b + 231331.38c + 5811.3k$$

$$258356.6 = 419068.0a + 510528b + 275937.2c + 6990k$$

$$158941.02 = 231331.38a + 275.937.2b + 191261.41c + 3715.5k$$

$$3510.5 = 5811.3a + 6990b + 3715.5c + 99k$$

solving simultaneously

$$a = .26944955$$

$$b = .1440955$$

$$c = .41811893$$

$$k = -6.223238$$

and the regression equation becomes

$$Y = .26944955X_1 + .1440955X_2 + .41811893X_3 - 6.223238$$

The regression equation yields a coefficient of multiple correlation of .698, which is highly significant.

Advantage of Three Factor Regression

The analysis of the advantages of three factor

regression over the single factor regressions is shown in Table 1.

Table 1

Analysis of Three Factor and Single Factor Regression

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F
Three factor regression	3	20443.22		
3 factor Residuals	95	21552.00	226.86	
X_1 Regression	1	9324.20		
X_2 Regression	1	6642.38		
X_3 Regression	1	14618.54		
Advantage of multiple over X_1 Regression	2	11119.02	5559.5	24.51
Advantage of multiple over X_2 Regression	2	13800.84	6901.47	30.42
Advantage of multiple over X_3 Regression	2	5824.68	2912.34	12.84
Needed for significance at one percent level with 2 and 95 degrees of freedom 4.82				

In all instances a highly significant advantage was shown in favor of the multiple regression over each single factor regression. In other words, counties in

which all three factors, high percentage of roads surfaced, high taxable valuation per child, and the high percentage of secondary schools consolidated, were operating have a greater tendency to close their one-room schools than those counties where only one factor was operating. The coefficient of multiple correlation, which is higher than any single coefficient of correlation, suggests that each of these three factors may be largely independent of either of the others.

SUMMARY AND CONCLUSIONS

It was the purpose of this investigation to test the relationship existing between the closing of one-room rural schools and five related factors.

The data necessary to compute the percentage of closed schools in 1946-47 were obtained directly from the Office of the Department of Public Instruction since the biennial report for that period was not available. The percentage of the total miles of rural roads surfaced was taken from the report of the State Highway Commission for the period ending June 30, 1946. The figures used as the taxable property per farm child were taken from the report of the Iowa Tax Commission for the period ending 1941, and was expressed in hundreds. The data used to compute the percentage of consolidation among districts maintaining high schools were obtained from the biennial report of the Department of Public Instruction for the period 1942-44. The figures used to compute the two population factors were taken from the United States Census reports for 1930 and 1940.

The data for all five factors were arranged by counties. The coefficient of correlation between the percentage of closed one-room rural schools and each

of the five factors was determined. The coefficient of correlation between the percentage of closed schools and the total miles of rural roads surfaced was found to be .4712. The coefficient of correlation between the percentage of closed schools and the taxable property per farm child was found to be .3977. The coefficient of correlation between the percentage of closed schools and the percentage of consolidation among districts maintaining high schools was found to be .5900. When these three coefficients of correlation were tested for significance each was found to be significantly different from zero at the one percent level.

The coefficient of correlation between the percentage of closed schools and the loss in farm population was found to be .0088. The coefficient of correlation between the percentage of closed schools and the density of farm population was found to be .0434. When these two coefficients of correlation were tested for significance they were found to be not significantly different from zero.

The three factors which showed a significant relationship to the closed one-room schools were used in a regression equation to predict the number of closed schools. When the regression from all three factors was tested against regression from each factor singly

it was found that the advantages of the multiple regressions were highly significant.

It should not be concluded that this analysis has taken into account all of the possible factors affecting the closing of one-room rural schools. Many of the possible factors were of necessity disregarded as an analysis of all of them would require a great deal more time than this study warrants.

Other factors which may be related to the closing of the one-room schools in Iowa may be:

1. The type of farming in the county.
2. The ratio of rural to urban population.
3. The proximity of rural people to town and cities.
4. The type of administrative organization of the farm school districts.
5. The availability of teachers for one-room rural schools.

There may be other hypotheses in addition to the foregoing. No attempt has been made here to test these hypotheses. In the future any study designed to test these or other hypotheses as explanation of the closed school movement should control upon the three factors found in this study to be related to the number of closed one-room schools.

SELECTED REFERENCES

Aurner, Clarence R. History of Education in Iowa. Iowa City: State Historical Society of Iowa. 1914.

American Institute of Cooperation. Farm Leaders and Teachers Plan Together. Washington: National Education Association. 1947.

Beal, Anne Elizabeth. Comparison of Rural and Urban Ninth Grade Children in Personal Adjustment. Master's Thesis. Ames: Iowa State College. 1940.

Brown, George A. Iowa's Consolidated Schools. Des Moines: Department of Public Instruction. 1922.

Bureau of the Census. United States Department of Commerce. Fifteenth Census of the United States, Characteristics of the Population. Vol. 3. Part 1. Washington. 1930.

Bureau of the Census. United States Department of Commerce. Sixteenth Census of the United States, Characteristics of the Population. Vol. 2. Part 2. Washington. 1940.

Bureau of the Census. United States Department of Commerce. County Data Book. Washington. 1940.

Bureau of the Census. United States Department of Commerce. Census of Agriculture: 1945, Statistics for Counties. Vol. 1. Part 9. Washington. 1946.

Cope, Earl. "Story of the Formation of Iowa's Largest School District." Midland Schools. 61:110. December, 1946.

Frost, Norman. "What Size School System?" The Nation's Schools. 23:57-58. February, 1939.

Gaar, Johnnie B. Education Qualifications of Teachers in One-Room Schools in Iowa. Master's Thesis. Ames: Iowa State College. 1942.

Gaumnitz, W. H. Are the One-Teacher Schools Passing? Pamphlet 92. United States Department of Interior, Office of Education. Washington: Printing Office. 1940.

Iowa, Code of Iowa, 1946. Vol. 1. 1946.

Iowa Department of Public Instruction. Biennial Reports, 1873-1944.

Iowa Farm Bureau Federation. Next Steps in Rural Education. Des Moines: The Iowa Farm Bureau Federation. 1946.

Iowa General Assembly. Acts and Joint Resolutions Passed at the Regular Session of the Fifty-Second General Assembly. State of Iowa. 1947.

Iowa State College Staff Members. A Century of Farming in Iowa. Ames: Iowa State College Press. 1946.

Iowa State Highway Commission. Report for the Period July 1, 1945 to June 30, 1946. Ames: The Iowa State Highway Commission. 1946.

Lancelot, W. H. and Morgan, Barton. Iowa's Vanishing Farm Youth and Their Schools. Bulletin P81. Ames: Iowa Agricultural Experiment Station. 1946.

Lancelot, W. H. Rural School Reorganization in Iowa. Bulletin P69. Ames: Iowa Agricultural Experiment Station. 1944.

Molesberry, Hazel. Sociability and Knowledge of Social Standards of Eighth Grade Pupils in Adair County. Master's Thesis. Ames: Iowa State College. 1936.

Moore, Glenn. Aptitudes, Interests, and Personality Characteristics of Farm and Non-Farm Pupils of the State Center High School. Master's Thesis. Ames: Iowa State College. 1948.

Samuelson, Agnes and Williams, R. C. Public School Finance in Iowa. Research Bulletin No. 6. Des Moines: Department of Public Instruction. 1930.

Sanderson, Dwight. Rural Sociology and Rural Social Organization. New York: John Wiley & Sons, Inc. 1942.

Thaden, J. F. and Elliott, Eugene B. "Closed Michigan Rural Schools." East Lansing: Michigan Agricultural Experiment Quarterly Bulletin. Vol. 29. No. 2. November, 1946.

Wakeley, Ray E. Changes in Iowa Population. Bulletin 356. Ames: Iowa Agricultural Experiment Station. 1947.

APPENDIX

TABLE 2

School Corporations in Iowa*

1850	1262
1855**	
1860	1013
1865	1171
1870	1510
1875	3670
1880	4354
1885	4603
1890	4641
1895	4807
1900	4873
1905	4948
1910	5001
1915	4985
1920	4724
1925**	

continued on next page

*Department of Public Instruction. Biennial Reports for years indicated.

**No figures available for this date.

TABLE 2 (Continued)

1930	4874
1935	4876
1940	4865
1945***	4855

***Iowa Department of Public Instruction.

TABLE 3

Consolidated School Districts*

1900	1
1905	30
1910	51
1915	180
1920	368
1925	385
1930	412
1935	409
1940	407
1945**	408

*Iowa Department of Public Instruction. Biennial Reports, for years indicated.

**Iowa Department of Public Instruction.

TABLE 4

One-Room Rural School Enrollments*

1916	210,992
1918	199,616
1920	173,811
1922**	
1924**	
1926	167,759
1928	149,520
1930	145,758
1932	145,035
1934	135,527
1936	127,495
1938	117,842
1940	109,528
1942	104,860
1944	99,757
1946***	95,340

*Iowa Department of Public Instruction. Biennial Reports. For years indicated.

**No figures available for these years.

***Iowa Department of Public Instruction.

TABLE 5

Number of One-Room Schools in Operation*

1850	914
1855**	
1860	4927
1865	5732
1870	6919
1875	9203
1880	10590
1885	10949
1890	12094
1895	12517
1900	12615
1905	12263
1910	12403
1915	11988
1920	9855
1925	9670
1930	9276

continued on next page

*Iowa Department of Public Instruction. Biennial Reports for years indicated.

**No figures available for 1855.

TABLE 5 (Continued)

1935	9119
1940	8326
1945***	7375

***Iowa Department of Public Instruction.

TABLE 6

Rural One-Room School Statistics

County	Total number one-room rural schools	Number in operation 1946-47	Number closed 1946-47	Percent of schools closed 1946-47
Adair	103	88	15	14.5
Adams	80	62	18	22.6
Allamakee	120	92	28	23.3
Appanoose	105	83	22	20.5
Audubon	84	78	6	7.1
Benton	131	7	124	94.7
Black Hawk	87	37	50	57.4
Boone	105	28	77	73.3
Bremer	87	73	14	16.1
Buchanan	111	51	60	54.0
Buena Vista	30	1	29	96.7
Butler	107	80	27	25.2
Calhoun	89	69	20	22.5
Carroll	99	36	63	63.6
Cass	109	95	14	12.8
Cedar	80	29	51	63.8
Cerro Gordo	98	49	49	50.0
Cherokee	69	22	47	68.1
Chickasaw	100	84	16	16.0
Clarke	84	62	22	26.2
Clay	64	33	31	48.4
Clayton	139	119	20	14.4
Clinton	98	68	20	20.4
Crawford	142	122	20	14.1
Dallas	64	37	27	42.2
Davis	91	82	9	10.0
Decatur	100	74	26	26.0
Delaware	77	61	16	20.8
Des Moines	31	30	1	3.3
Dickinson	24	3	21	87.5

continued on next page

TABLE 6 (Continued)

County	Total number one-room rural schools	Number in operation 1946-47	Number closed 1946-47	Percent of schools closed 1946-47
Dubuque	109	86	23	21.1
Emmet	68	22	46	67.9
Fayette	117	77	40	34.2
Floyd	84	38	46	54.8
Franklin	100	28	72	72.0
Fremont	66	30	36	54.5
Greene	80	33	47	58.8
Grundy	88	54	34	30.4
Guthrie	112	78	34	30.4
Hamilton	103	57	46	44.7
Hancock	102	75	27	26.4
Hardin	93	66	27	29.0
Harrison	110	100	10	9.1
Henry	68	42	26	38.2
Howard	97	74	23	23.7
Humboldt	69	27	42	60.9
Ida	80	46	34	42.5
Iowa	116	73	43	37.1
Jackson	124	96	28	22.6
Jasper	152	113	39	25.7
Jefferson	80	69	11	13.7
Johnson	135	97	38	28.1
Jones	105	62	43	41.0
Keokuk	100	49	51	51.0
Kossuth	156	65	91	58.6
Lee	73	40	33	45.2
Linn	133	69	64	48.1
Louisa	31	22	9	29.3
Lucas	84	65	19	22.4
Lyon	105	105	00	00.0

continued on next page

TABLE 6 (Continued)

County	Total number one-room rural schools	Number in operation 1946-47	Number closed 1946-47	Percent of schools closed 1946-47
Madison	92	51	41	44.6
Mahaska	115	81	34	29.6
Marion	93	69	24	25.8
Marshall	46	23	23	50.0
Mills	56	54	2	3.6
Mitchell	75	42	33	44.0
Monona	69	55	14	20.3
Monroe	92	82	10	10.9
Montgomery	68	51	17	25.0
Muscatine	72	60	12	16.7
O'Brien	111	54	57	51.3
Osceola	69	50	19	27.5
Page	92	68	24	26.1
Palo Alto	86	33	53	62.3
Plymouth	139	80	59	42.2
Pocahontas	80	47	33	41.6
Polk	66	33	33	50.0
Pottawattamie	176	106	70	39.8
Poweshiek	106	71	35	33.0
Ringgold	96	66	30	31.5
Sac	117	65	52	44.4
Scott	95	83	12	13.2
Shelby	109	71	38	34.9
Sioux	146	111	35	24.0
Story	53	5	48	90.6
Tama	120	89	31	25.8
Taylor	109	95	14	12.8
Union	80	58	22	27.5
Van Buren	79	50	29	36.7
Wapello	88	64	24	27.3

continued on next page

TABLE 6 (Continued)

County	Total number one-room rural schools	Number in operation 1946-47	Number closed 1946-47	Percent of schools closed 1946-47
Warren	80	55	25	31.3
Washington	100	84	16	16.0
Wayne	94	69	15	16.0
Webster	113	64	49	43.4
Winnebago	76	58	18	23.7
Winneshiek	129	108	21	16.3
Woodbury	102	73	29	28.4
Worth	69	44	25	36.2
Wright	117	69	48	41.0

Iowa Department of Public Instruction.

TABLE 7

Rural Road Statistics

County	Total miles of all rural systems	Total miles surfaced	Percent of total surfaced
Adair	1,080.60	261.85	24.2
Adams	845.02	168.18	19.9
Allamakee	1,089.97	831.81	76.3
Appanoose	868.58	460.08	53.0
Audubon	863.55	145.33	16.8
Benton	1,351.85	835.35	61.8
Black Hawk	999.81	744.32	74.4
Boone	1,082.41	1,025.49	94.7
Bremer	809.67	566.49	70.0
Buchanan	1,041.97	407.24	39.1
Buena Vista	1,109.50	1,006.75	90.7
Butler	1,055.50	841.65	80.7
Calhoun	1,090.10	1,025.70	94.1
Carroll	1,071.90	845.15	78.8
Cass	1,071.20	233.70	21.8
Cedar	1,029.93	563.74	54.7
Cerro Gordo	1,090.03	967.38	88.7
Cherokee	1,079.90	715.90	66.3
Chickasaw	957.90	645.40	67.4
Clarke	739.35	175.80	23.8
Clay	1,053.80	907.85	86.2
Clayton	1,201.17	597.22	49.7
Clinton	1,160.96	724.90	62.4
Crawford	1,465.10	304.40	20.8
Dallas	1,035.83	902.94	87.2
Davis	968.24	202.71	20.9
Decatur	946.88	175.26	18.5
Delaware	989.60	709.85	71.7
Des Moines	705.36	373.62	53.0
Dickinson	734.00	548.75	74.8

continued on next page

TABLE 7 (Continued)

County	Total miles of all rural systems	Total miles surfaced	Percent of total surfaced
Dubuque	862.07	615.84	71.4
Emmet	713.40	666.60	93.4
Fayette	1,288.07	852.72	66.2
Floyd	923.95	634.54	68.7
Franklin	1,070.17	1,000.28	93.5
Fremont	909.00	274.40	30.2
Greene	1,028.08	978.08	95.1
Grundy	913.18	709.50	77.7
Guthrie	1,086.50	509.30	46.9
Hamilton	1,034.48	965.29	93.3
Hancock	1,064.20	982.70	92.3
Hardin	1,066.90	884.20	82.9
Harrison	1,268.80	207.70	16.4
Henry	782.63	378.35	48.3
Howard	799.25	683.50	85.5
Humboldt	758.20	743.20	98.0
Ida	917.50	399.31	43.5
Iowa	1,024.10	390.25	38.1
Jackson	961.83	295.52	30.7
Jasper	1,408.68	604.73	42.9
Jefferson	844.34	236.96	28.1
Johnson	1,115.74	681.30	61.1
Jones	957.51	607.53	63.4
Keokuk	1,097.03	328.20	29.9
Kossuth	1,800.70	1,358.20	75.4
Lee	846.41	621.46	73.4
Linn	1,314.10	878.60	66.9
Louisa	664.76	360.42	54.2
Lucas	762.05	221.76	29.1
Lyon	1,121.10	751.10	67.0

continued on next page

TABLE 7 (Continued)

County	Total miles of all rural systems	Total miles surfaced	Percent of total surfaced
Madison	1,086.10	427.43	39.4
Mahaska	1,095.96	702.02	64.1
Marion	1,019.10	557.15	54.7
Marshall	1,024.55	888.13	86.7
Mills	755.10	234.10	31.0
Mitchell	857.59	708.49	82.6
Monona	1,145.91	333.30	29.1
Monroe	731.20	434.50	59.4
Montgomery	754.31	501.59	66.5
O'Brien	1,119.50	724.10	64.7
Osceola	800.10	580.10	72.5
Page	1,046.19	285.27	27.3
Palo Alto	999.70	940.90	94.1
Plymouth	1,577.50	671.99	42.6
Pocahontas	1,145.70	909.60	79.4
Polk	1,116.77	1,071.64	96.0
Pottawattamie	1,697.90	346.67	20.4
Poweshiek	1,100.13	419.96	38.2
Ringgold	1,013.40	220.35	21.7
Sac	1,121.70	949.20	84.6
Scott	748.25	508.38	67.9
Shelby	1,063.15	238.75	22.5
Sioux	1,468.90	1,165.40	79.3
Story	1,067.30	988.00	92.6
Tama	1,280.00	957.77	74.8
Taylor	994.07	177.46	17.9
Union	796.01	214.76	27.0
Van Buren	876.49	248.87	28.4
Wapello	830.57	343.14	41.3

continued on next page

TABLE 7 (Continued)

County	Total miles of all rural systems	Total miles surfaced	Percent of total surfaced
Warren	1,076.30	429.10	39.9
Washington	983.37	411.24	41.8
Wayne	917.58	245.71	26.8
Webster	1,250.01	1,217.67	97.4
Winnebago	766.70	624.62	81.5
Winneshiek	1,144.25	812.98	71.0
Woodbury	1,422.63	478.56	33.6
Worth	730.88	651.02	89.1
Wright	1,008.52	984.54	97.6
Total	101,440.30	59,513.11	58.7

Iowa State Highway Commission. Report for the Period July 1, 1945 to June 30, 1946. State of Iowa. pp. 248-251.

TABLE 8

Taxable Property Per Farm Child

County	Taxable property per farm child age 5-20 inc.	County	Taxable property per farm child age 5-20 inc.
Adair	$7,095	Fremont	$7,500
Adams	6,870	Greene	8,910
Allamakee	4,950	Grundy	9,480
Appanoose	4,040	Guthrie	6,465
Audubon	7,465	Hamilton	7,860
Benton	9,140	Hancock	7,040
Black Hawk	6,900	Hardin	7,910
Boone	6,815	Harrison	6,615
Bremer	6,305	Henry	6,400
Buchanan	5,620	Howard	5,470
Buena Vista	9,990	Humboldt	8,685
Butler	6,350	Ida	9,135
Calhoun	9,045	Iowa	6,950
Carroll	6,710	Jackson	5,540
Cass	8,790	Jasper	7,010
Cedar	9,040	Jefferson	6,555
Cerro Gordo	7,490	Johnson	6,570
Cherokee	8,510	Jones	7,175
Chickasaw	5,350	Keokuk	6,685
Clarke	5,600	Kossuth	6,920
Clay	9,085	Lee	6,045
Clayton	5,680	Linn	6,795
Clinton	8,200	Louisa	6,945
Crawford	8,440	Lucas	5,225
Dallas	8,485	Lyon	7,195
Davis	4,795	Madison	6,340
Decatur	4,695	Mahaska	5,980
Delaware	6,060	Marion	6,440
Des Moines	6,410	Marshall	7,810
Dickinson	7,130	Mills	8,300

continued on next page

TABLE 8 (Continued)

County	Taxable property per farm child age 5-20 inc.	County	Taxable property per farm child age 5-20 inc.
Dubuque	$5,025	Mitchell	$6,545
Emmet	8,270	Monona	7,160
Fayette	6,130	Monroe	4,485
Floyd	6,795	Montgomery	8,840
Franklin	8,150	Muscatine	5,035
O'Brien	9,115	Tama	8,685
Osceola	8,160	Taylor	6,250
Page	8,755	Union	6,870
Palo Alto	6,470	Van Buren	5,075
Plymouth	8,340	Wapello	5,305
Pocahontas	7,950	Warren	6,200
Polk	8,495	Washington	7,155
Pottawattamie	7,185	Wayne	5,745
Poweshiek	7,920	Webster	8,130
Ringgold	5,470	Winnebago	4,965
Sac	9,190	Winneshiek	5,210
Scott	8,745	Woodbury	7,150
Shelby	7,160	Worth	6,314
Sioux	5,885	Wright	7,990
Story	7,975		

U. S. Census of 1940 and Report of Iowa Tax Commission in 1941. Cited by Lancelot, W. H. and Morgan, Barton. Iowa's Vanishing Farm Youth and Their Schools. Bulletin P81. Ames: Iowa Agricultural Experiment Station. 1946. pp. 686-87.

TABLE 9

Consolidated and Non-Consolidated High School Districts

County	High school districts consolidated	High school districts not consolidated	Percent of number of H. S. in county which are consolidated
Adair	3	4	42.9
Adams	3	3	50.0
Allamakee	2	6	25.0
Appanoose	1	11	08.3
Audubon	2	3	40.0
Benton	4	8	33.3
Black Hawk	5	3	62.5
Boone	6	4	60.0
Bremer	1	7	12.5
Buchanan	5	5	50.0
Buena Vista	14	1	93.3
Butler	4	7	36.4
Calhoun	4	6	40.0
Carroll	2	10	16.7
Cass	2	6	25.0
Cedar	6	4	60.0
Cerro Gordo	5	4	55.5
Cherokee	9	2	81.8
Chickasaw	1	8	11.1
Clarke	0	4	00.0
Clay	9	3	75.0
Clayton	1	16	05.9
Clinton	6	10	37.5
Crawford	2	10	16.7
Dallas	9	8	53.0
Davis	1	7	12.5
Decatur	2	8	20.0
Delaware	7	4	63.6
Des Moines	6	4	60.0
Dickinson	10	1	90.9

continued on next page

TABLE 9 (Continued)

County	High school districts consolidated	High school districts not consolidated	Percent of number of H. S. in county which are consolidated
Dubuque	0	13	00.0
Emmet	5	2	71.4
Fayette	6	10	37.5
Floyd	4	3	57.2
Franklin	4	4	50.0
Fremont	8	2	80.0
Greene	6	2	75.0
Grundy	4	5	44.5
Guthrie	3	6	33.3
Hamilton	4	5	44.5
Hancock	3	7	30.0
Hardin	6	8	42.8
Harrison	5	6	45.4
Henry	6	6	50.0
Howard	0	5	00.0
Humboldt	4	9	30.7
Ida	1	4	20.0
Iowa	3	5	37.5
Jackson	2	10	16.7
Jasper	2	10	16.7
Jefferson	2	5	28.5
Johnson	1	7	12.5
Jones	3	7	30.0
Keokuk	6	10	37.5
Kossuth	5	9	35.7
Lee	3	8	27.3
Linn	5	11	31.3
Louisa	8	3	72.8
Lucas	1	4	20.0
Lyon	0	8	00.0

continued on next page

TABLE 9 (Continued)

County	High school districts consolidated	High school districts not consolidated	Percent of number of H. S. in county which are consolidated
Madison	5	3	62.5
Mahaska	3	6	33.3
Marion	6	10	37.5
Marshall	16	3	84.0
Mills	3	6	33.3
Mitchell	5	6	45.5
Monona	4	6	40.0
Monroe	0	6	00.0
Montgomery	6	4	60.0
Muscatine	1	6	14.5
O'Brien	5	5	50.5
Osceola	2	3	40.0
Page	2	11	15.4
Palo Alto	5	4	55.5
Plymouth	3	11	21.5
Pocahontas	6	4	60.0
Polk	10	7	58.8
Pottawattamie	4	10	28.6
Poweshiek	4	4	50.0
Ringgold	4	6	40.0
Sac	4	6	40.0
Scott	0	3	00.0
Shelby	4	6	40.0
Sioux	2	13	13.3
Story	13	5	72.2
Tama	4	11	26.6
Taylor	1	10	09.1
Union	4	5	44.4
Van Buren	2	8	20.0
Wapello	0	7	00.0

continued on next page

TABLE 9 (Continued)

County	High school districts consolidated	High school districts not consolidated	Percent of number of H. S. in county which are consolidated
Warren	8	6	57.1
Washington	4	7	36.4
Wayne	2	8	20.0
Webster	7	5	58.6
Winnebago	1	6	14.3
Winneshiek	0	12	00.0
Woodbury	13	6	68.4
Worth	2	5	28.6
Wright	1	7	12.5

Iowa Department of Public Instruction. Biennial Report. Des Moines. 1942-44.

TABLE 10

Population Statistics

County	Loss in population per sq. mi. of farm land, age 5-19 inc., 1930 and 1940	Density of population per sq. mi. of farm land, age 5-19 inc., 1940
Adair	.84	4.22
Adams	.51	4.54
Allamakee	.47	5.23
Appanoose	1.10	5.13
Audubon	1.37	4.92
Benton	1.20	4.57
Black Hawk	.61	6.28
Boone	.02*	6.34
Bremer	1.16	6.38
Buchanan	.54	5.55
Buena Vista	1.08	4.29
Butler	.79	5.47
Calhoun	.95	4.79
Carroll	.89	6.26
Cass	1.32	4.22
Cedar	1.20	4.51
Cerro Gordo	.86	4.82
Cherokee	.66	4.71
Chickasaw	.96	5.36
Clarke	.53	4.18
Clay	.62	4.35
Clayton	.66	5.18
Clinton	1.05	4.57
Crawford	1.28	4.58
Dallas	1.33	4.96

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*This is an increase in population.

TABLE 10 (Continued)

County	Loss in population per sq. mi. of farm land, age 5-19 inc., 1930 and 1940	Density of population per sq. mi. of farm land, age 5-19 inc., 1940
Davis	.95	4.14
Decatur	1.22	4.44
Delaware	.66	6.04
Des Moines	.87	5.37
Dickinson	.59	4.57
Dubuque	.79	6.57
Emmet	1.43	4.10
Fayette	.60	5.57
Floyd	.59	4.51
Franklin	1.24	4.57
Fremont	1.25	4.79
Greene	1.27	4.36
Grundy	1.88	4.30
Guthrie	.90	5.05
Hamilton	1.24	5.00
Hancock	1.05	4.96
Hardin	1.74	4.65
Harrison	1.49	5.06
Henry	.97	5.16
Howard	.70	4.82
Humboldt	1.39	4.53
Ida	1.23	4.37
Iowa	1.25	4.83
Jackson	.25	4.77
Jasper	.89	5.15
Jefferson	1.02	4.51
Johnson	.45	5.37
Jones	.85	4.85
Keokuk	.96	5.15
Kossuth	.80	5.13

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TABLE 10 (Continued)

County	Loss in population per sq. mi. of farm land, age 5-19 inc., 1930 and 1940	Density of population per sq. mi. of farm land, age 5-19 inc., 1940
Lee	.66	5.39
Linn	1.55	5.09
Louisa	.24	4.88
Lucas	1.05	4.86
Lyon	.67	5.27
Madison	.83	4.61
Mahaska	1.10	5.80
Marion	1.11	5.36
Marshall	1.57	4.92
Mills	1.30	4.66
Mitchell	.77	5.09
Monona	1.15	4.57
Monroe	.77	5.20
Montgomery	1.04	4.13
Muscatine	.84	5.46
O'Brien	.88	4.68
Osceola	1.25	5.06
Page	1.60	4.32
Palo Alto	.29	5.37
Plymouth	1.15	4.50
Pocahontas	.68	5.16
Polk	1.22	6.61
Pottawattamie	1.54	5.18
Poweshiek	1.04	4.46
Ringgold	1.05	3.88
Sac	.66	4.66
Scott	1.19	5.62
Shelby	1.13	5.32
Sioux	.89	6.90
Story	1.43	5.14

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TABLE 10 (Continued)

County	Loss in population per sq. mi. of farm land, age 5-19 inc., 1930 and 1940	Density of population per sq. mi. of farm land, age 5-19 inc., 1940
Tama	.77	4.61
Taylor	.74	4.46
Union	.94	3.77
Van Buren	1.04	3.92
Wapello	.40	5.73
Warren	1.21	5.16
Washington	.68	5.30
Wayne	.88	3.82
Webster	.71	5.00
Winnebago	1.69	5.88
Winneshiek	.66	5.69
Woodbury	1.34	4.88
Worth	.67	5.03
Wright	1.11	4.56

Bureau of the Census. United States Department of Commerce. Fifteenth Census of the United States, Characteristics of the Population. Vol. 3. Part 1. Washington: Bureau of the Census. 1930. pp. 774-80.

Bureau of the Census. United States Department of Commerce. Sixteenth Census of the United States, Characteristics of the Population. Vol. 2. Part 2. Washington. 1940. pp. 921-26.

Bureau of the Census. United States Department of Commerce. County Data Book. Washington. 1940. pp. 146-54.

Bureau of the Census. United States Department of Commerce. Census of Agriculture, Statistics for Counties. Vol. 2. Part 9. Washington. 1945. pp. 18-39.